CLAIMS

1. An attachment for a telescopic material handler enabling support and manipulation of a load, the attachment comprising:

a gripping system that securely holds the load;

a manipulation assembly supporting the gripping system, the manipulation assembly being movable in at least five degrees of freedom; and

an operator-controlled control system effecting control of the manipulation assembly.

2. An attachment according to claim 1, wherein the load comprises one of building panels and pipes.

3. An attachment according to claim 1, wherein the manipulation assembly is pivotable about a first axis generally perpendicular to a ground plane, defining a first degree of freedom,

the manipulation assembly comprising a main arm supporting the gripping system, wherein the main arm is pivotable about a second axis generally parallel to the ground plane, defining a second degree of freedom,

the manipulation assembly further comprising a panel rotator assembly attached to the main arm via a four bar mechanism, wherein the four bar mechanism pivots the panel rotator assembly about a third axis generally parallel to the ground plane and the second axis, defining a third degree of freedom and effecting rotation of the load,

wherein the gripping system is rotatable relative to the main arm by the panel rotator assembly about a fourth axis generally parallel to the ground plane and perpendicular to the second and third axes, defining a fourth degree of freedom and effecting rotation of the load about a normal axis, and

wherein the gripping system is translatable relative to the main arm, defining a fifth degree of freedom.

4. An attachment according to claim 1, wherein the gripping system comprises a vacuum pump, a plurality of vacuum cups, and a vacuum reservoir.

5. An attachment according to claim 4, wherein the vacuum cups are divided into at least two independent circuits, and wherein each independent circuit includes a vacuum reservoir.

6. An attachment according to claim 5, wherein each independent circuit of the gripping system further comprises a manifold valve that separates its respective vacuum reservoir from the vacuum pump, and wherein upon failure of the vacuum pump, each of the manifold valves closes to preserve vacuum in its respective reservoir.

7. An attachment according to claim 6, wherein the gripping system further comprises a vacuum switch that measures a vacuum level, the attachment further comprising a first signal coupled with the vacuum switch, the first signal indicating that sufficient vacuum has been achieved.

8. An attachment according to claim 7, further comprising a system controller receiving input from the vacuum switch, the system controller opening and closing the manifold valves based on the vacuum level.

9. An attachment according to claim 8, wherein the system controller controls the vacuum pump and the first signal, and wherein the attachment further comprises at least a second signal activated by the system controller when the vacuum level is below a predetermined level.

10. An attachment according to claim 9, wherein the operator-controlled control system comprises a primary radio transmitter and a secondary radio transmitter, and wherein control of the load is transferable between the primary and secondary radio transmitters.

11. An attachment according to claim 4, wherein the gripping system further comprises a clamp.

12. An attachment according to claim 4, wherein the vacuum cups comprise a soft touch attachment including isolation and suspension components that protect the load.

13. An attachment according to claim 1, wherein the operator-controlled control system comprises a primary radio transmitter and a secondary radio transmitter, and wherein control of the load is transferable between the primary and secondary radio

transmitters, the attachment further comprises control indicators providing a visual indication of which radio transmitter is in control of the load.

14. A method of manipulating a load, the method comprising:

holding the load with a gripping system; and

supporting the gripping system with a manipulation assembly for movement in at least five degrees of freedom via an operator-controlled control system.

15. A method according to claim 14, comprising pivoting the manipulation assembly about a first axis generally perpendicular to a ground plane, defining a first degree of freedom,

wherein the manipulation assembly includes a main arm supporting the gripping system, and wherein the method comprises pivoting the main arm about a second axis generally parallel to the ground plane, defining a second degree of freedom,

wherein the manipulation assembly further includes a panel rotator assembly attached to the main arm via a four bar mechanism, wherein the method comprises pivoting the panel rotator assembly via the four bar mechanism about a third axis generally parallel to the ground plane and the second axis, defining a third degree of freedom and effecting rotation of the load,

wherein the method further comprises rotating with the panel rotator assembly the gripping system relative to the main arm about a fourth axis generally parallel to the ground plane and perpendicular to the second and third axes, defining a fourth degree of freedom and effecting rotation of the load about a normal axis, and

wherein the method further comprises translating the gripping system relative to the main arm, defining a fifth degree of freedom.

16. A method according to claim 14, wherein the gripping system further includes a vacuum switch that measures a vacuum level, the method further comprising generating a first signal indicating that sufficient vacuum has been achieved based on output from the vacuum switch.

17. A method according to claim 16, wherein the gripping system comprises a vacuum pump, a plurality of vacuum cups, and a vacuum reservoir, wherein the vacuum cups are divided into at least two independent circuits, and wherein each independent

circuit includes a vacuum reservoir, each independent circuit of the gripping system further comprising a manifold valve that separates its respective vacuum reservoir from the vacuum pump, and wherein upon failure of the vacuum pump, the method comprising closing each of the manifold valves to preserve vacuum in its respective reservoir.

18. A method according to claim 16, further comprising activating a second signal when the vacuum level is below a predetermined level.

19. A method according to claim 14, wherein the operator-controlled control system includes a primary radio transmitter and a secondary radio transmitter, and wherein the method further comprises enabling transferring of control of the load between the primary and secondary radio transmitters.

20. A method according to claim 19, further comprising providing a visual indication of which radio transmitter is in control of the load.

21. A method according to claim 14, wherein the load comprises a cladding panel, the method further comprising flipping the cladding panel over prior to installation.

22. A method according to claim 21, wherein the flipping step comprises attaching the gripping system to a first side of the cladding panel, rotating the cladding panel about an axis generally parallel to a longitudinal axis of the cladding panel, releasing the cladding panel onto a support member, and attaching the gripping system to a second side of the cladding panel.

23. An attachment for a telescopic material handler enabling support and manipulation of a load, the attachment comprising:

a gripping system that securely holds the load, the gripping system including a vacuum pump, a plurality of vacuum cups, and a vacuum reservoir, wherein the vacuum cups are divided into at least two independent circuits, and wherein each independent circuit includes a vacuum reservoir;

a manipulation assembly supporting the gripping system, the manipulation assembly being movable in at least five degrees of freedom;

an operator-controlled control system effecting control of the manipulation

assembly; and

a plurality of indicators signaling a status of the attachment.